

ROOM AND ELEVATED TEMPERATURE MECHANICAL PROPERTIES OF A PM TiAl ALLOY:\* C.T. Liu, P.J. Maziasz, S.J. Pawel, J.H. Schneibel, V.K. Sikka, L.R. Walker, Martin Marietta Energy Systems, Inc., ORNL, and Y-12 Plant, P.O. Box 2008, Oak Ridge, TN 37831-6115; D.R. Clemens, Adv. Eng. Operations, P&W, West Palm Beach, FL; and T.G. Nieh, LLNL, Livermore, CA 94550.

Alloy powder of the TiAl alloy with the composition Ti-47Al-2Cr-2Nb (at. %) was prepared by rotary atomization, followed by hot-extrusion and subsequent heat-treatments to produce refined lamellar structures and fine duplex structures. The mechanical properties of the TiAl alloy were determined at temperatures to 1000°C in air, and the microstructures were characterized by TEM, SEM and electron microprobe analyses. The alloy with the refined lamellar structure showed excellent mechanical properties at both room and elevated temperatures. It exhibited a tensile ductility of 2% and a yield strength of 971 MPa (140.9 ksi) at room temperature. The yield strength remains approximately constant up to 800°C and decreases to 555 MPa (80.5 ksi) at 1000°C. The transverse fracture toughness, estimated by three-point bend testing of chevron-notched specimens at room temperature, is 22.4 MPa  $\sqrt{m}$ . The mechanical properties of the alloy will be discussed in terms of microstructural and chemical features as well as the fracture modes.

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